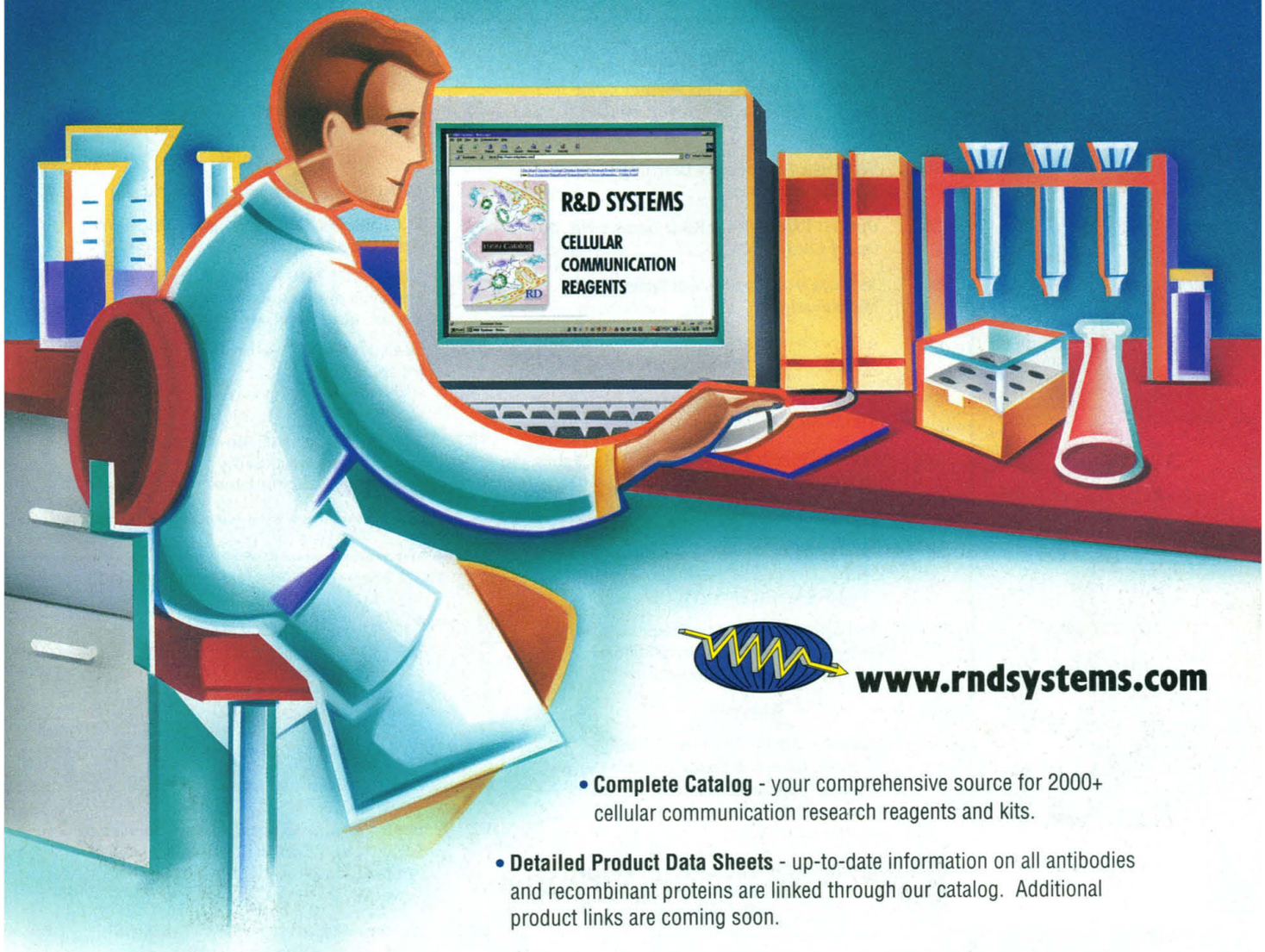
23 April 1999

Science

Vol. 284 No. 5414
Pages 545–700 $8

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

CyberScience



www.rndsystems.com

- **Complete Catalog** - your comprehensive source for 2000+ cellular communication research reagents and kits.
- **Detailed Product Data Sheets** - up-to-date information on all antibodies and recombinant proteins are linked through our catalog. Additional product links are coming soon.
- **Reviews and Technical Notes** - on proteins such as the Eph/Ephrins and BMPs and tips to guide you through applications such as immunochemistry and western blot.
- ***The Cytokine Bulletin*** - this on-line version of our popular newsletter chronicles the latest advances in cytokine research.

FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES.

North America
R&D Systems, Inc.
614 McKinley Place NE
Minneapolis, MN 55413, USA
Tel: 612 379-2956
Fax: 612 379-6580
info@rndsystems.com

Europe
R&D Systems Europe Ltd.
4-10 The Quadrant, Barton Lane
Abingdon, OX14 3YS, UK
Tel: +44 (0)1235 551100
Fax: +44 (0)1235 533420
info@rndsystems.co.uk

Germany
R&D Systems GmbH
Borsigstrasse 7
65205 Wiesbaden, Germany
Tel: +49 (0)6122 90980
Fax: +49 (0)6122 909819
infogmbh@rndsystems.co.uk

Europe Free Phone
Belgique/België: 0800 10 468
Danmark: 80 01 85 92
France: 0800 90 72 49
Nederland: 060 225607
Norge: 800 11033
Sverige: 020 79 31 49
Switzerland: 0800 55 2482

R&D SYSTEMS

1-800-343-7475

Circle No. 49 on Readers' Service Card

VOLUME 284 23 APRIL 1999 NUMBER 5414

Science

www.sciencemag.org

COVER Newly discovered fossils from the Middle Awash valley of Ethiopia's Afar depression are 2.5 million years old. The remains include the cranium (~21 cm long) with jaw (~10 cm long) of a surprising new hominid species, *Australopithecus garhi*, as well as antelope limb bones (17.5 cm long) showing that early hominids were butchering large mammals for meat and marrow at this early date. [Photos: © David L. Brill/1999 Atlanta]

568
Grizzlies imperiled?

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Domestic individual membership and subscription (51 issues): $110 ($62 allocated to subscription). Domestic institutional subscription (51 issues): $325; Foreign postage extra: Mexico, Caribbean (surface mail) $55; other countries (air assist delivery) $90. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. **Printed in the U.S.A.**

SCIENCE'S COMPASS

EDITORIAL

LETTERS

POLICY FORUM

BOOKS *ET AL.*

PERSPECTIVES

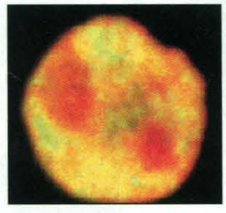
598

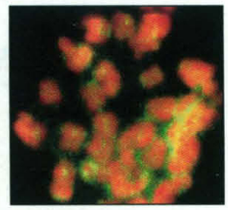
Revving up gene transcription with an antiterminator

REVIEW

TECHNICAL COMMENTS

www.sciencemag.org/cgi/content/full/284/5414/555a





654

Getting ready for the light

SCIENCE ONLINE
www.scienceonline.org

SCIENCE
THE JOURNAL
www.sciencemag.org

SCIENCENOW
DAILY NEWS SERVICE
www.sciencenow.org

NEXT WAVE
WEEKLY CAREER UPDATES
www.nextwave.org

GRANTSNET
RESEARCH FUNDING DATABASE
www.grantsnet.org

NEUROAIDS
EXPERIMENTAL WEB SITE
www.sciencemag.org/NAIDS

Change of address: allow 4 weeks, giving old and new addresses and 8-digit account number. **Postmaster:** Send change of address to *Science*, P.O. Box 1811, Danbury, CT 06813–1811. **Single copy sales:** $8.00 per issue prepaid includes surface postage; bulk rates on request. **Authorization to photocopy** material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that $4.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075/83 $4.00. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

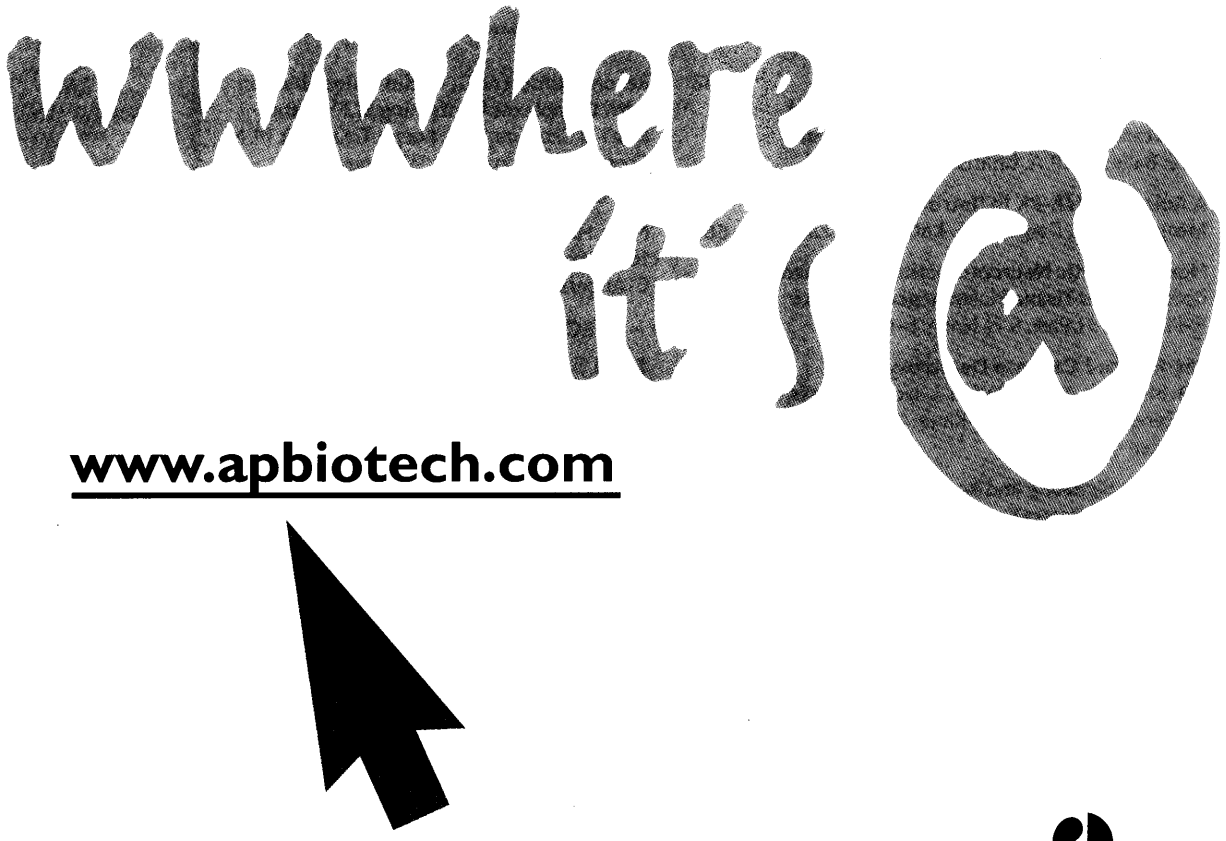
The new Amersham Pharmacia Biotech web site is up and running. It's like no other site you've ever visited in Life Science.

Look at the WebCat, our on-line product catalogue, which contains all our latest product information. And, because it gets updated the instant we've got something new for you, you can always be sure it is the very latest.

To help you on your way, we've also incorporated an advanced Search function that speeds you to the information you are most likely to need. A click on the "Related" button on a page will take you directly to technical documentation, application notes, FAQs and any other related subjects.

If you don't happen to find the answer you need in any of the above, you can always e-mail your enquiries to our Technical Support help-desk and we'll get back to you with the answer.

These are just some of the features.
Log on now and discover.



www.apbiotech.com

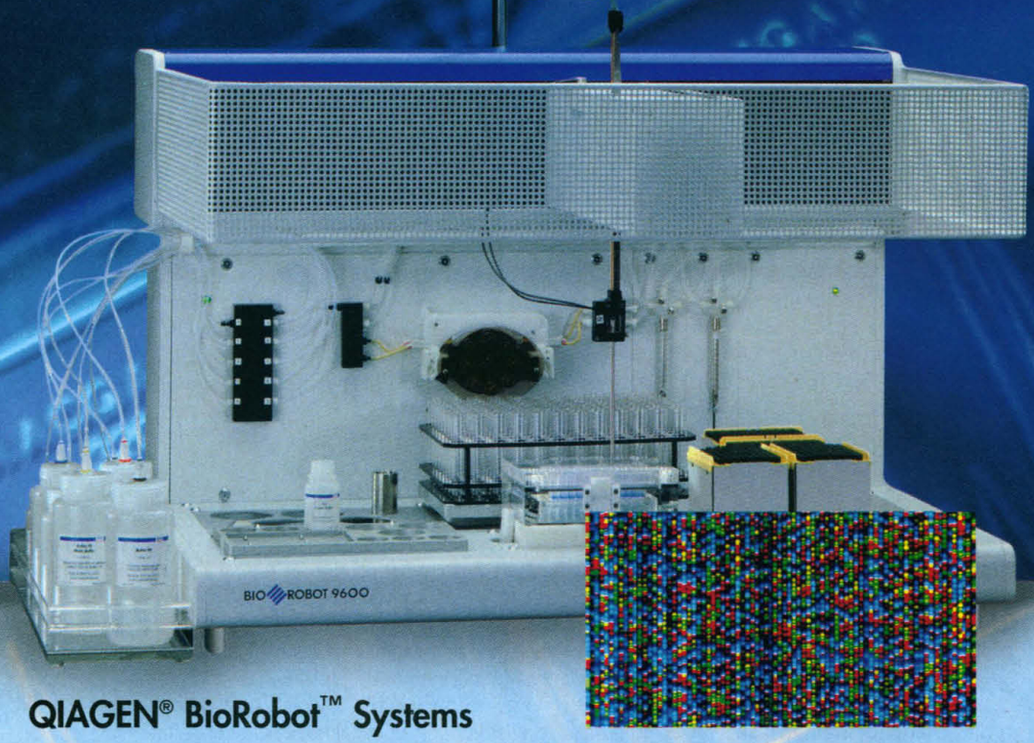
amersham pharmacia biotech

MORE THAN JUST INSTRUMENTS

Complete systems to automate your sequencing projects

PROJECTS

- Sequencing
- PCR
- Genomic DNA
- RNA
- Liquid handling



QIAGEN® BioRobot™ Systems

Successful automation of demanding sequencing projects requires more than just an instrument for front-end applications. BioRobot™ Systems go further by integrating proven QIAGEN® chemistries, ready-to-run protocols, and innovative instrumentation — for consistent, publication-ready results.

Dependable sequencing preparation — BioRobot Systems bring together our reliable purification technologies and accurate small-volume pipetting to enhance sequencing performance and simplify your projects. Ready-to-run protocols facilitate template purification (plasmid, BAC, PCR products, and M13) and reaction setup. Data are easily exchanged with automated sequencers and other laboratory instruments — for maximum convenience.

Comprehensive system support — The QIAGEN support team is always there to help you with all aspects of the system — chemistry, applications, and instrumentation.

Complete automated systems — from the company that understands molecular biology

Contact QIAGEN today for more information.

QIAGEN BioRobot Systems are not available in all countries; please inquire.
The PCR process is covered by U.S. Patents 4,683,195 and 4,683,202 and foreign equivalents owned by Hoffmann-La Roche AG.

http://www.qiagen.com

Germany:	USA:	Australia:	Canada:	France:	Japan:	Switzerland:	UK:
QIAGEN GmbH	**QIAGEN Inc.**	**QIAGEN Pty Ltd**	**QIAGEN Inc.**	**QIAGEN S. A.**	**QIAGEN K.K.**	**QIAGEN AG**	**QIAGEN Ltd.**
Tel. 02103-892-240	Tel. 800-426-8157	Tel. 03-9489-3666	Tel. 800-572-9613	Tel. 01-60-920-930	Tel. 03-5805-7261	Tel. 061-319-30-31	Tel. 01293-422-999
Fax 02103-892-255	Fax 800-718-2056	Fax 03-9489-3888	Fax 800-713-5951	Fax 01-60-920-925	Fax 03-5805-7263	Fax 061-319-30-33	Fax 01293-422-922

DISTRIBUTORS: Austria/Hungary/Slovenia Austria (01) 889 18 19 **Belgium/Luxemburg** 0800-1-9815 **Brazil** (11) 543 1455 or 0800 55 1321 **Central & South America** USA (305) 828-3818 **China** (852)2896-6283 **Czech Republic** (02)4447 1239 **Denmark** 43 86 87 88 **Finland** (09)-804 551 **Greece** (01)-643 61 38 **India** (011)-542 1714 **Israel** 02. 584 1111 **Italy** (055) 500 1871 **Korea** (02) 924-86 97 **Malaysia** (03)-7312099 **Mexico** USA (661) 294-7940 **The Netherlands** (033)-4950094 **New Zealand** (09)980 6700 or 0800 933 966 **Norway** 22 90 00 00 **Poland** (071) 351 41 06 or 351 54 20 **Portugal** (1)-751 6000 **Singapore** 445 7927 **Slovak Republic** (07) 54 01 336 **South Africa** (021) 615166 **Spain** (93) 902.20.30.90 **Sweden** (08) 621 34 00 **Taiwan** (02) 2880 2913 **Thailand** (02) 412-5672 **In other countries contact:** QIAGEN GmbH, Germany

QIAGEN

BR3SOQP95WWW

Circle No. 50 on Readers' Service Card

MEGAFLOOD BASALT

Flood basalts are large outpourings of magma (up to millions of cubic kilometers) that occur in a relatively short period of time (few million years), such as the Deccan flood basalt, which formed near the end-Cretaceous extinction, and the Siberian flood basalt, which formed during the end-Permian extinction. Marzoli *et al.* (p. 616; see the Perspective by Olsen) now suggest that perhaps the largest flood basalt province formed 200 million years ago during the major extinction at the Triassic-Jurassic boundary. They dated extensive dikes and other basaltic rocks in North Central Brazil to 200 million years ago and correlated these rocks with other basalts with similar ages spanning the coastal regions of North and South America, Africa, and Europe. Altogether, the volume of the basaltic magma may have been 3 million cubic kilometers.

BARELY SOLVATING AN ELECTRON

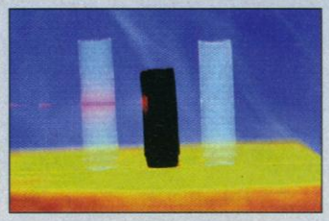
Water not only solvates ions but can even solvate single electrons, as occurs when aqueous iodide ions eject their electrons into the solvent during ultraviolet irradiation. Lehr *et al.* (p. 635) have used femtosecond-resolved photoelectron spectroscopy to determine how small a water cluster is needed to support a solvated electron. Clusters of four water molecules around an iodide ion showed a simple decay after photoexcitation, but clusters with five or six water molecules appeared to rearrange their structure and stabilize the free electron as bulk water does.

EMERGENCE OF *HOMO*

The time from 2 to 3 million years ago marks several fundamental developments in human evolution: The first use of tools, expansion of diet to include carnivory, changes in habitat and posture, an increase of brain size, and, finally, the emergence of *Homo*. Fossils from this critical time have been scarce, however, so it has been difficult to reconstruct much of this history and the phylogeny with confidence. Asfaw *et al.* (p. 629) now describe a new species of *Australopithecus* from Ethiopia, based on the remains of a partial cranium, that may be an ancestor of early *Homo* and descended from *A. afarensis*. Other remains include a mandible and femur and other postcranial bones (likely from several individuals). de Heinzelin *et al.* (p. 625; see the cover) show that these fossils date to 2.5 million years ago. They also describe scarred and crushed bones, which suggest that early hominids were acquiring meat and marrow with primitive tools (see the news story by Culotta).

USE GLUE SPARINGLY

Silica sols can be used to produce microporous materials (aerogels), and a simple route to creating new porous materials would be to use the silica to "glue" other small particles, such as metal colloids or polymer particles, together. However, as often happens in building a model airplane, too much glue is incorporated, and the silica usually coats the other particles completely. Morris *et al.* (p. 622) show that drying composite gels of silica sols and metal, oxide, carbon, or polymer particles under supercritical conditions creates nanocomposites that retain the properties of both components. For example, incorporating carbon blacks creates electrically conducting (and optically absorbing) aerogel networks.



HANGING ON TO THE HOST

Latency-associated nuclear antigen (LANA) is a protein encoded by the Kaposi's sarcoma–associated herpesvirus (KSHV) that is commonly expressed in KSHV-infected tumors. Ballestas *et al.* (p. 641) provide evidence that LANA mediates persistence of the viral DNA as an episome (an autonomously replicating element) in infected cells by tethering it to the host chromosomes. Blocking this process might be a new way of preventing or treating these tumors.

LOSING RNA IN A HAIRPIN TURN

Transcription termination is one of the processes used to regulate gene expression, and this process has been simulated in vitro by Yarnell and Roberts (p. 611; see the Perspective by Landick) for an intrinsic *Escherichia coli* terminator. The two termination elements, a U-encoding element and a hairpin structure, promote polymerase pausing and extract RNA from the transcription complex, respectively. In this context, an antiterminator counteracts termination by inhibiting hairpin formation and, as a result, allows transcription readthrough. A model for intrinsic termination and antitermination is proposed in which the terminator hairpin extracts the nascent RNA from RNA polymerase as the polymerase molecule translocates forward in the absence of RNA synthesis.

T CELL KINASES

Multiple kinases are required to convey signals from lymphocyte antigen receptors. The Tec kinase family member BTK is critical for B lymphocyte antigen receptor signaling. T lymphocytes contain three Tec kinases, but whether they play a role in T cell development and function has been unclear. Schaeffer *et al.* (p. 638) report that removing one Tec kinase does not render the T cell system impotent, but mice genetically deficient in Tec family members Rlk and Itk had disrupted signaling through phospholipase C, which led to a lack of cytokine production, proliferation, and a defective immune response to *Toxoplasma gondii*. Thus, Tec kinases are critical for the development of effective T cell function and immunity.

NO NO MEANS YES

How many "safeties" must a system have to prevent inadvertent activation? The cell death pathway initiated by the binding of the cell surface receptor Fas to its ligand has multiple levels of controls built in. The heart of the effector pathway is the caspase protease cascade in which each intermediate protease activates the next protease through cleavage. Mannick *et al.* (p. 651) found that the zymogen form of caspase-3 is nitrosylated on its catalytic site cysteine and that denitrosylation correlates with caspase activation.

TOO MUCH OF A GOOD THING

Although plants thrive on light, too much light can give the plant a biochemical equivalent of sunburn. When there are not enough of the photosystem molecules responsible for transforming photons into biochemical redox power, the excess energy from light may be expressed as reactive oxygen intermediates that can damage nearby molecules. Karpinski *et al.* (p. 654; see the Perspective by Foyer and Noctor) now show the existence of a component that can move systemically through the plant and signal the need to prepare for more incoming photons, even to leaves still in the shade.

CONTINUED ON PAGE 555

Raise sensitivity in luminescense and decrease your costs.

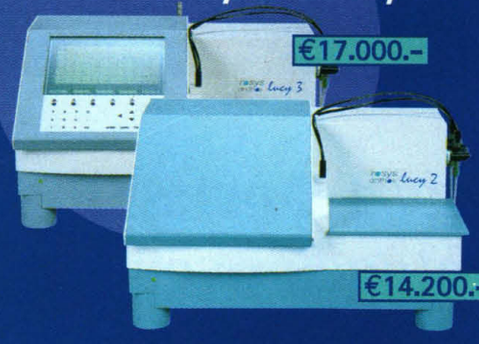
anthos Lucy1

€20.500.-

Lucy1 with Peltier cooling and heating is established in the scientific community as the reference for highest sensitivity levels available from a microplate luminometer.

High Sensitivity • Temperature Control • Syringe Dispensers

anthos Lucy2, Lucy3



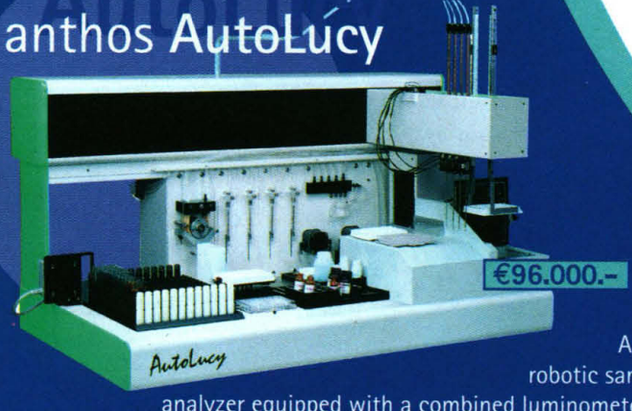
€17.000.-

€14.200.-

Lucy2,the economic solution, and Lucy3, the "stand-alone" version, are the perfect choice for all routine tasks in luminescence, offering the famous sensitivity level common to all Lucy models.

Compact Design • Easy Use • Evaluation Onboard

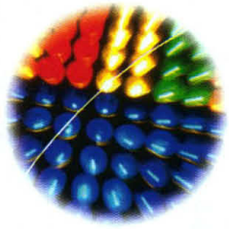
rosys anthos AutoLucy



€96.000.-

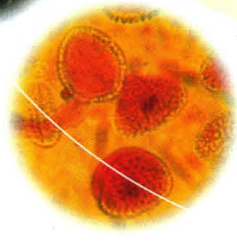
AutoLucy is the first robotic sample processor and analyzer equipped with a combined luminometer and photometer, offering 'walk away' automation of all types of microplate luminescence assays.

Robotic Analyzer • Luminescence and Photometry • Flexible Setup and Options



Luminescence Takes Over Now!

Chemiluminescent and bioluminescent detection methods introduce unparalleled benefits for many applications. Immunoassays profit significantly from enhanced sensitivity and virtually unlimited dynamic range, compared to photometry. With luminescence, reporter gene assays become most sensitive and multiple labels allow signal normalization and cotransfection experiments. All Rosys Anthos luminometers feature additional photometry capability and dispensers, providing a maximum of flexibility for new applications and for changing labels.



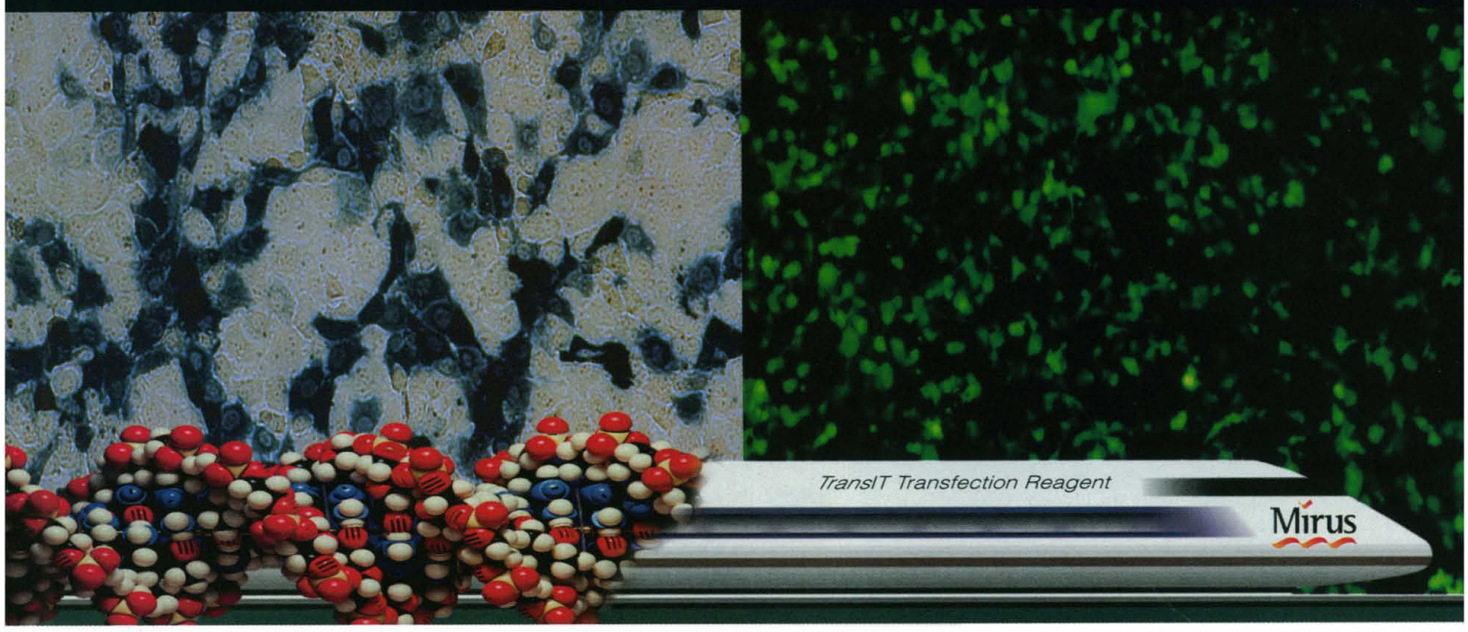
rosys anthos

Circle No. 47 on Readers' Service Card

Luminometer Photometer Automation Software

Anthos Labtec Instruments, Lagerhausstrasse 507, A-5071 Wals/Salzburg, Austria
Tel: (+43) 662 857 220 , Fax: (+43) 662 857 223, e-Mail: anthos@anthos-labtec.com, **Homepage: www.anthos-labtec.com**

Take the *Trans*IT® Authority



NIH 3T3 cells, β-galactosidase expression

COS-7 cells, green fluorescent protein (GFP) expression

*Trans*IT Polyamine Low Toxicity Transfection Reagents offer clear advantages over liposome-mediated transfections.

High Efficiency: Achieve the highest transfection efficiency over a wide range of cell types.

Low Toxicity: Achieve maximal transfection efficiencies with minimal toxicity by simply mixing your nucleic acid with the *Trans*IT Reagent and adding it to your cells in their complete media.

Cost-effective: Perform more transfections per dollar spent compared to other industry-leading reagents.

Fast and Convenient: Transfections performed in less than one hour! No need to change media to remove complexes.

Easy as *1-2-3:*

1. Prepare complexes
2. Add complexes to cells
3. Harvest

***TransIT** Reagents – Your Express Route to Transfection*

Worldwide distributors:

Austria	genXpress	43-1-789-8106
Belgium	Sopachem n.v.	32-2-474-50-70
Canada:	Bio/Can Scientific	(905) 828-2455
France	Takara Biomedical Europe S.A.	33-1-41-47-01-14
Germany	MoBiTec GmbH	49-551-371062
Greece	Bega Ltd.	30-1-3300403
India	BioBusiness Development Agency	91-11-559-6820
Israel	Zotal, Ltd.	972-3-5462269
Japan	Takara Shuzo Co., Ltd.	81-775-43-7247
Switzerland	JURO Supply AG	41-41-226-20-60
United Kingdom	Cambridge BioScience	44-1223-316855
United States	Fisher Scientific	800-766-7000

PANVERA

Circle No. 24 on Readers' Service Card

PanVera Corporation • 545 Science Dr., Madison WI 53711
Phone: 608.233.9450 • Fax: 608.233.3007
E-Mail: info@panvera.com

800.791.1400
In the USA and Canada

www.panvera.com

Announcing chemdex.com

The Faster, Easier Way to Purchase Biological and Chemical Reagents.

Spend less time searching for reagents and more time pursuing your research. When you purchase your reagents through chemdex.com, you get:

- The world's largest source of biological and chemical reagents for life science research
- Ordering with the click of a mouse—in a secure environment
- The suppliers you know—and trust
- A powerful, precision search engine to quickly find what you need

Purchase your reagents faster. Easier. ONLINE.
At www.chemdex.com.

chemdex.com

Search less.
Discover more.

Chemdex Corporation • 3950 Fabian Way, Palo Alto, CA 94303 • 650-813-0300

Science

www.sciencemag.org

Published by the **American Association for the Advancement of Science (AAAS)**, *Science* serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Plant Genomics

at Cornell University

As part of a university-wide genomics initiative, Cornell University in partnership with the Boyce Thompson Institute for Plant Research and USDA/ARS is soliciting applications from outstanding candidates for faculty and staff scientist positions in plant biochemistry/metabolism, developmental biology, and genetics. The appointees are expected to form an interactive team utilizing genomic approaches and, as appropriate, the latest techniques in biochemistry, genetics, analytical chemistry, and cell biology. Topics of interest include understanding fundamental mechanisms in plant development or unraveling the catalytic and regulatory pathways by which plants produce, accumulate and recycle primary and secondary metabolites and determining the adaptive and nutritional properties of such compounds.

FACULTY POSITIONS

College of Agriculture and Life Sciences

Assistant Professor of Plant Biochemistry: Candidates are sought whose research focuses on the characterization of fundamental metabolic and/or signaling pathways essential to the growth and development of the plant and/or to the plant's response to environmental stimuli or biological stress, using functional genomics approaches. Contribution to the design and teaching of a Curriculum in plant biochemistry is expected. Applicants should send curriculum vitae, statement of research interests, and names of at least three references to: Plant Search Committee, 252 Emerson Hall, Cornell University, Ithaca, NY 14853-1901, attn: Laurie Hanley (ljh4@cornell.edu) phone 607-255-1655; fax 607-255-6683. Position open until filled; review of applications to commence on May 30, 1999.

Assistant Professor of Plant Biochemistry: Candidates are sought whose research deals with the identification and modification of biosynthetic pathways responsible for production of secondary chemicals that are involved in nutrition, plant responses to pathogens or the environment. Contribution to the design and teaching of a curriculum in plant biochemistry is expected. Applicants should send curriculum vitae, statement of research interests, and names of at least three references to: Plant Search Committee, 252 Emerson Hall, Cornell University, Ithaca, NY 14853-1901, attn: Laurie Hanley (ljh4@cornell.edu) phone 607-255-1655; fax 607-255-6683. Position open until filled; review of applications to commence on May 30, 1999.

Assistant Professor of Plant Developmental Biology: Candidates are sought whose research focuses on the analysis of developmental processes in plants. Those studying the molecular and genetic bases of development and who employ genome-based methodologies will be viewed with particular interest. Contribution to teaching in the area of plant developmental biology is expected. Applicants should send curriculum vitae, statement of research interests, and names of at least three references to: Plant Search Committee, 252 Emerson Hall, Cornell University, Ithaca, NY 14853-1901, attn: Laurie Hanley (ljh4@cornell.edu) phone 607-255-1655; fax 607-255-6683. Position open until filled; review of applications to commence on May 30, 1999.

Assistant Professor of Plant Developmental Biology and Evolution: Candidates are sought whose research deals with the study of plant development, especially in the context of molecular evolution. · Preference will be given to candidates with a strong background in molecular and developmental biology and who utilize modern genomic approaches to ask interesting questions in developmental/evolutionary biology. Contribution to teaching in the area of plant developmental biology/evolutionary biology is expected. Applicants should send curriculum vitae, statement of research interests, and names of at least three references to: Plant Search Committee, 252 Emerson Hall, Cornell University, Ithaca, NY 14853-1901, attn: Laurie Hanley (ljh4@cornell.edu) phone 607-255-1655, fax 607-255-6683. Position open until filled; review of applications to commence on May 30, 1999.

Assistant Professor of Plant Breeding/Genetics: Candidates are also sought to develop and direct an innovative program for the genetic improvement of potato using techniques of genomics, cell/molecular biology, genetics, and breeding. The appointee will be a key member of an interdisciplinary group working on pathogen/pest resistance in potato and will interact with other Cornell programs working on genetics/genomics of solanaceous species. Applicants should send a curriculum vitae and statement of research interests, and have at least three references sent to: Potato Search Committee Chair, Department of Plant Breeding, Cornell University, Ithaca, NY 14853-1901. For additional information, see www.plbr.cornell.edu or contact Elizabeth Earle (ede3@cornell.edu), 607-255-3102, 607-255-6683 (fax).

The Boyce Thompson Institute For Plant Research

Assistant Scientist: The Boyce Thompson Institute for Plant Research invites applications for a tenure-track scientist who uses genomics or proteomics approaches to study fundamental mechanisms underlying plant biodiversity at the organismal or population levels. Generous start-up funds and excellent facilities are available. Applicants should send a curriculum vitae, statement of research interests, and names of at least three references to:
Molecular Biodiversity Search Committee, Boyce Thompson Institute,
Ithaca, New York 14853. Questions regarding the position may be directed to Dr. David Stern, 607-254-1306; email ds28@cornell.edu or Dr. Robert Kohut, 607-254-1233, e-mail: rjk9@cornell.edu

Cornell University is an affirmative action/equal opportunity employer.

CORNELL
UNIVERSITY

Postdoctoral Position

We currently have Postdoctoral Positions available at our Stine Haskell location.

These two postdoctoral positions are available immediately to study the pulmonary effects of inhaled particles. Both postdoctoral appointees will be expected to participate in mechanistic studies designed to elucidate toxicological effects of inhaled particles and fibers on the lung. One candidate should have extensive molecular and cell biology experience and a working knowledge of common molecular biology techniques, tissue culture methods and/or experience with ELISA and standard protein isolation techniques. The other candidate will be involved in mechanistic investigations on the pulmonary toxicity of perfluoropolymer resin combustion aerosols. The successful applicant should have an extensive background in pulmonary biochemistry with experience in aerosol generation and characterization. Additional responsibilities will include the supervision and coordination of traditional inhalation toxicology studies with particles and fibers. Both postdoctoral positions are one year assignments, renewable for a second year upon mutual agreement.

DuPont Life Sciences can offer you an excellent compensation and benefits package. To be considered, please forward your resume to: Human Resources-CR-DW, Haskell Laboratories, 1090 Elkton Road, Newark, DE 19711-3507. An equal opportunity employer, M/F/D/V.

DUPONT

DuPont Life Sciences

Postdoctoral Research at McGill University

Postdoctoral positions are available immediately to work on the identification and molecular characterization of genes regulating growth and life span in the nematode *Caenorhabditis elegans* and in vertebrates. Refer to the following papers: Wong *et al.*, 1995, **Genetics** 139:1247; Lakowski and Hekimi, 1996, **Science** 272: 1010; Ewbank *et al.*, 1997, **Science** 275: 980, and Hekimi *et al.*, 1998, **Trends Genet.** 14: 14. Candidates must possess demonstrated skills in molecular biology.

Apply by email to Dr. Siegfried Hekimi at **postdocs@notung.biol.mcgill.ca** or by fax at **514-398-1674**. Written applications can be sent to: **Anne Wong, Department of Biology, 1205 Dr. Penfield Avenue, Montreal, Quebec, H3A 1B1**. Applications should include a CV and names of 3 referees.

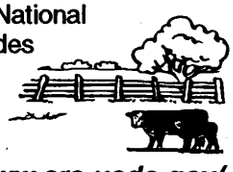
Agricultural Research Service
U.S. Department of Agriculture

Vacancy Announcement

NATIONAL PROGRAM LEADER FOR GRAZINGLANDS

Rangeland ♦ Pastures ♦ Forages

This senior-level position is on the ARS National Program Staff, which directs research policies and programs for USDA's chief in-house science agency. This position is responsible for research program planning, implementation, and evaluation, as well as serving as the Agency's technical expert in interagency and international collaborations for the Grazinglands National Program, which includes rangeland, pasture, and forage.



For details, see ***www.ars.usda.gov/afm/hrd/resjobs/ars-x9e-0267.htm*** or call 301-504-1337.

This position is located in ARS Headquarters in Beltsville, MD.

USDA/ARS is an equal opportunity employer and provider

University of Texas Southwestern Medical Center

Postdoctoral Positions in Stress Response Research

Two postdoctoral positions are available at the University of Texas Southwestern Medical Center at Dallas to study the regulation and function of stress response (HSP) pathways in disease pathogenesis (*Circ. Res.* 83 (2):117, 1998; *Am J Hum Gen.* 64: 685, 1999). Outstanding candidates with a doctoral degree for the position will be able to integrate techniques in mouse genetics and molecular physiology such as using NMR spectroscopy miniaturized for cardiovascular phenotypic analysis of transgenic and gene knockout models (*Proc. Natl. Acad. Sci.* USA 93:2339, 1996; *J. Biol. Chem.* 273:7523, 1998). Application deadline is May 30, 1999. Competitive salaries from training grant require US permanent residency or citizenship. Members of minority groups are particularly encouraged to apply. Candidates should direct all correspondence along with a letter of interest, curriculum vitae, and 2 letters of recommendations to:

Ivor J. Benjamin, M. D.
Associate Professor of Medicine
Integrative Biology Graduate Program
Division of Cell and Molecular Biology
The University of Texas Southwestern Medical Center at Dallas
5323 Harry Hines Blvd.
Dallas, TX 75235-8573
Fax: (214) 648-1475; ivor.benjamin@email.swmed.edu

UT Southwestern is an equal opportunity/affirmative action employer.

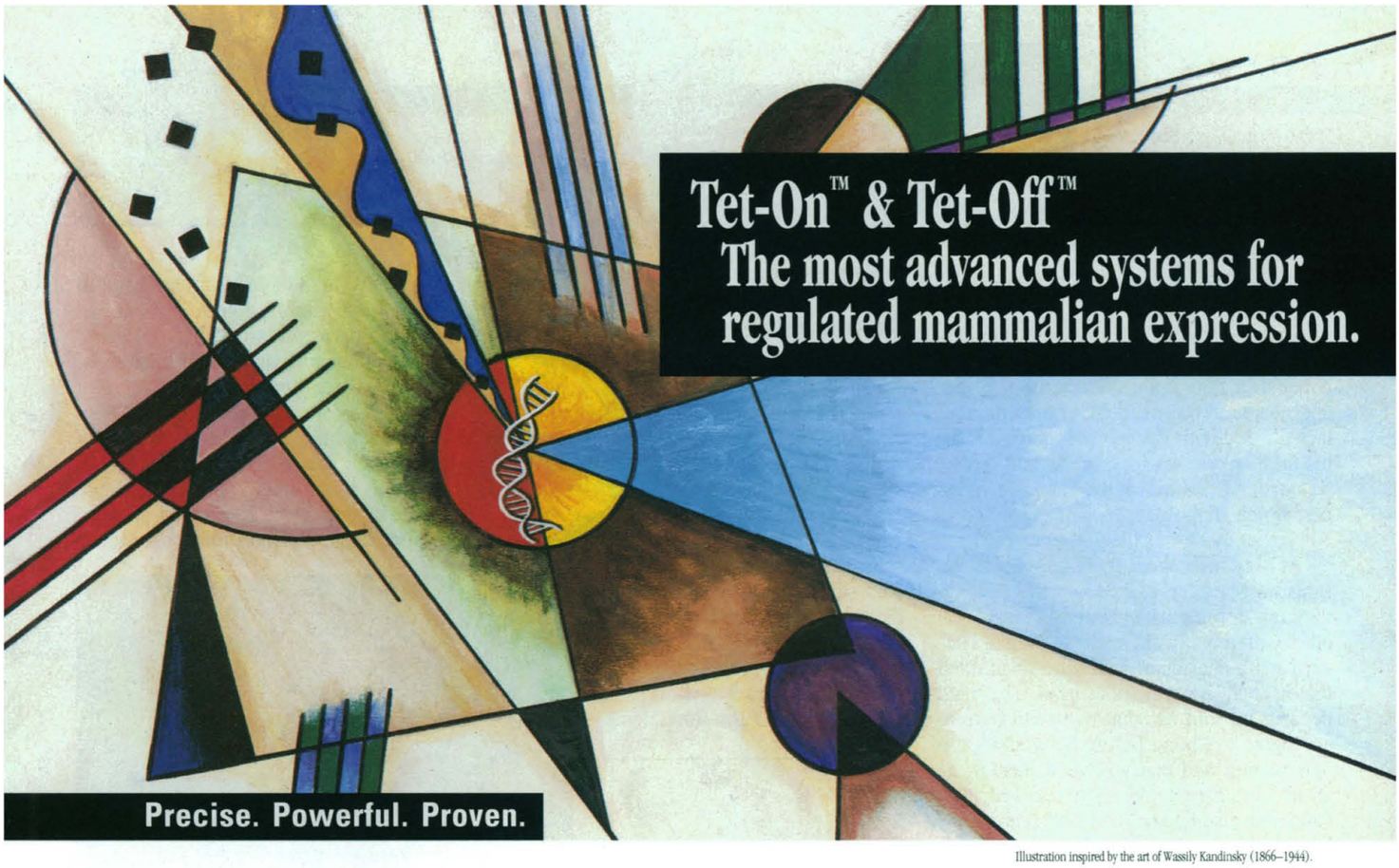
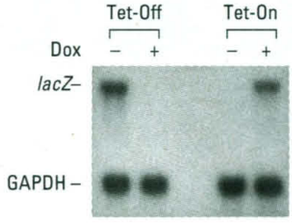
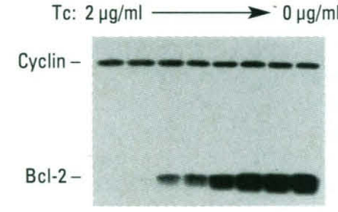


Illustration inspired by the art of Wassily Kandinsky (1866–1944).



Tet Systems offer inducible on/off control of gene expression. Northern analysis of RNA from HeLa Tet-Off and Tet-On cell lines stably expressing the *lacZ* gene under Tet regulation. Cells were cultured in +/– 1 µg/ml doxycycline (Dox), a tetracycline derivative.



Tet Systems provide precise control of inducible expression. HeLa S3 Tet-Off Cells stably expressing pTet-Off and pTRE-Bcl-2 were grown in decreasing amounts of tetracycline (Tc). Western analysis indicates 100-fold range of controlled induction of Bcl-2.

See the Tet System Bibliography at www.clontech.com/clontech/TetRefs.html

In Germany please contact CLONTECH GmbH • Tel: 06221 34170 Fax: 06221 303511
In the UK please contact CLONTECH UK Ltd. • Tel: 01256 476500 Fax: 01256 476499
In Japan please contact CLONTECH Japan Ltd. • Tel: 03 3523 9777 Fax: 03 3523 9781
In Switzerland please contact CLONTECH AG • Tel: 061 68354 50 Fax: 061 68354 52

Distributors: Australia: 61 7 3273 9100 ■ **Austria and Eastern Europe:** 43 1 3106688 ■ **Belgium/Luxembourg:** 0 800 1 9815 ■ **Brazil:** 55 11 66940539 ■ **Canada:** Now call CLONTECH direct • 800 662 2566 ■ **China:** BEIJING YUANGPING BIOTECH • 86 10 68187551; GENE CO. LTD. • 021 6428 7163; SINO-AMERICAN BIOTECH CO. • 86 21 6402 2371 ■ **Czech Republic:** 420 19 7265214 ■ **Egypt:** 202 349 8311 ■ **Finland:** 358 9708 596 19 ■ **France:** 33134 602424 ■ **Greece:** 301 51 53882 ■ **Hong Kong:** 852 2646 6101 ■ **Hungary:** 36 1 280 3728 ■ **India:** 91 11 54 21714 ■ **Israel:** 972 4 9960595 ■ **Italy:** 39 55 5 001871 ■ **Korea:** 82 2 556 0311 ■ **Malaysia:** 603 777 2611 ■ **Mexico:** 525 281 4718 ■ **The Netherlands:** 31 33 495 00 94 ■ **Norway:** 47 22 421 520 ■ **Portugal:** 351 361 36 20 ■ **Scandinavia:** 46 8 728 00 65 ■ **Singapore:** 65 775 7284 ■ **South Africa:** 27 21 615166 ■ **Spain:** 34 9 1 630 0379 ■ **Taiwan:** 886 2 27202215 ■ **Thailand:** 662 530 3804 4 ■ **Turkey:** 90 216 385 8321 rev.3/30/99

Notice to Purchaser

Use of tetracycline controllable expression systems is covered under U.S. patent # 5,464,758, assigned to BASF Bioresearch Corp. Prior to purchasing these products, nonacademic research institutions are required to obtain a license from BASF. For licensing information, please contact Amy Porter, Dir. of Business Development at BASF (Fax: 508-755-8506).

Tet-On/Tet-Off Gene Expression Systems (#K1621-1 & K1620-1) offer tight regulation without compromising high-level expression when fully induced. Tet Systems perform in both cell culture and transgenic applications—more than 300 journal articles prove that they are the system of choice for researchers. Their low baseline expression and precise on/off control even allow analysis of deleterious gene products. The most advanced systems come from CLONTECH. Call and order today!

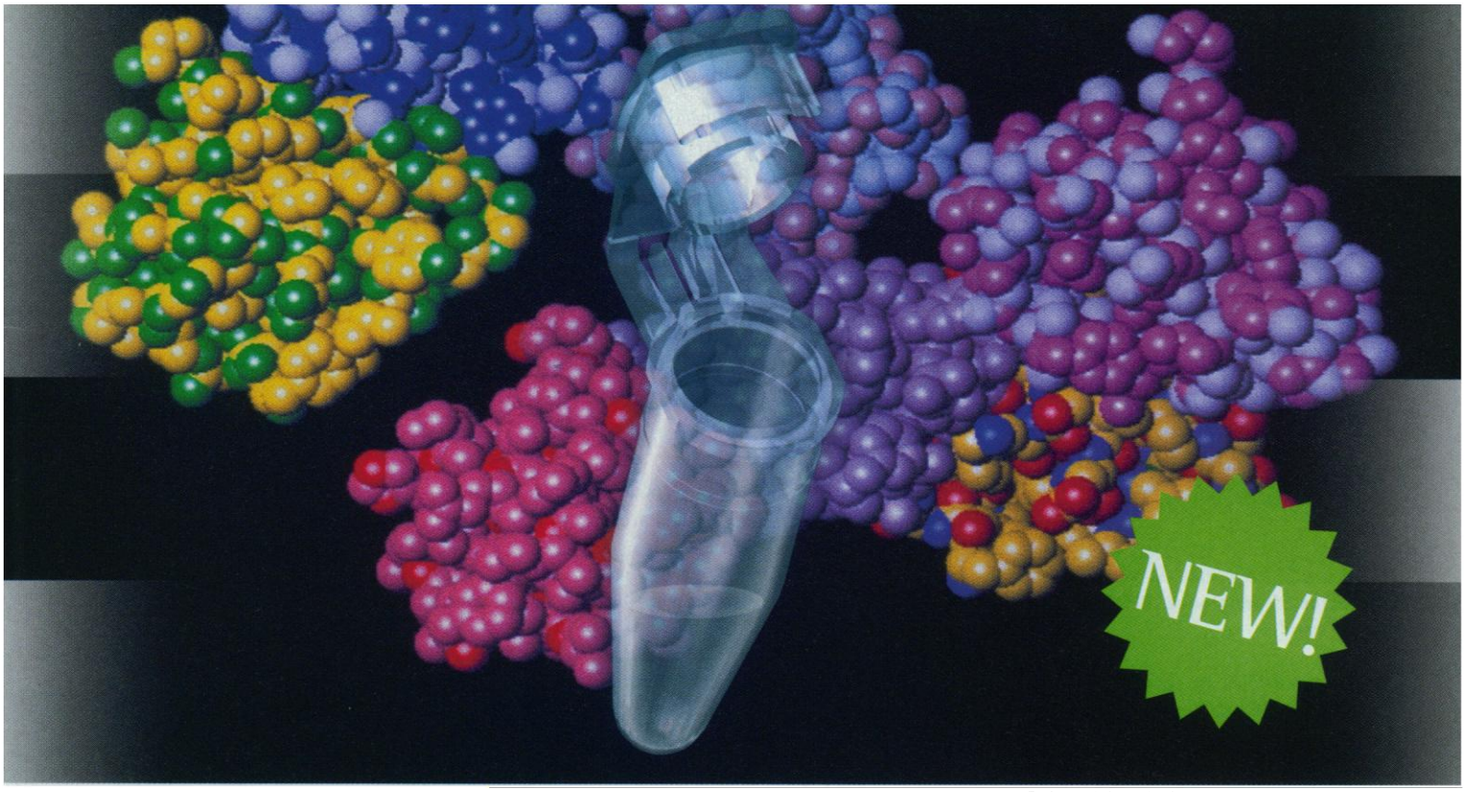
WINNER OF 100 AWARD

CLONTECH
NOW YOU CAN.

1020 East Meadow Circle, Palo Alto, California 94303 USA
Tel: 800-662-2566 (CLON) 650-424-8222 • Fax: 800-424-1350 650-424-1064
E-mail: tech@clontech.com orders@clontech.com • Internet: http://www.clontech.com

 (AD87728)

Circle No. 44 on Readers' Service Card



Background picture: Insuline, computer generated molecular model

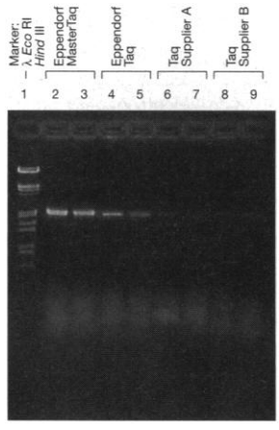
When the going gets tough, MasterTaq gets going

LICENSED FOR PCR

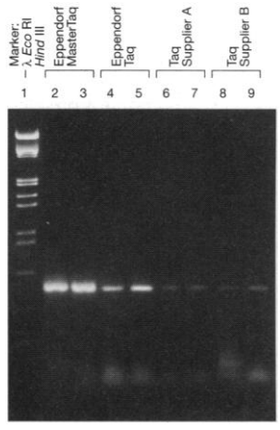
The Eppendorf **MasterTaq Kits** are designed to ensure improved yield and reliable PCR products.
The TaqMaster (5x PCR Enhancer) has been specially developed to improve the amplification of difficult templates by stabilizing the enzyme during the reaction procedure. TaqMaster improves the thermostability of the Eppendorf Taq DNA Polymerase and makes it less sensitive to exogenous PCR-inhibiting contaminations. Impure and GC-rich templates show increased yields and reproducible results.

The Eppendorf MasterTaq Kit includes the TaqMaster (5x PCR Enhancer), Eppendorf Taq DNA Polymerase, Reaction Buffer (10x) and $MgCl_2$ Solution.

The Polymerase Chain Reaction (PCR) is protected by patent. The patent is held by Hoffmann-La Roche. Products marked "licensed for PCR" are sold under licensing arrangements with F. Hoffmann-La Roche Ltd., Roche Molecular Systems, Inc. and The Perkin-Elmer Corporation.



● **Fig.1: Amplification of a SSU rRNA gene from total genomic algae DNA**
PCR was performed from genomic algae using different Taq DNA Polymerases. Equal volumes of the PCR reactions were analyzed by gel electrophoresis.



● **Fig. 2: Amplification of a GAPDH specific DNA fragment from genomic blood DNA**
PCR was performed from human genomic blood with different Taq DNA Polymerases. Equal volumes of the PCR reactions were analyzed by gel electrophoresis.

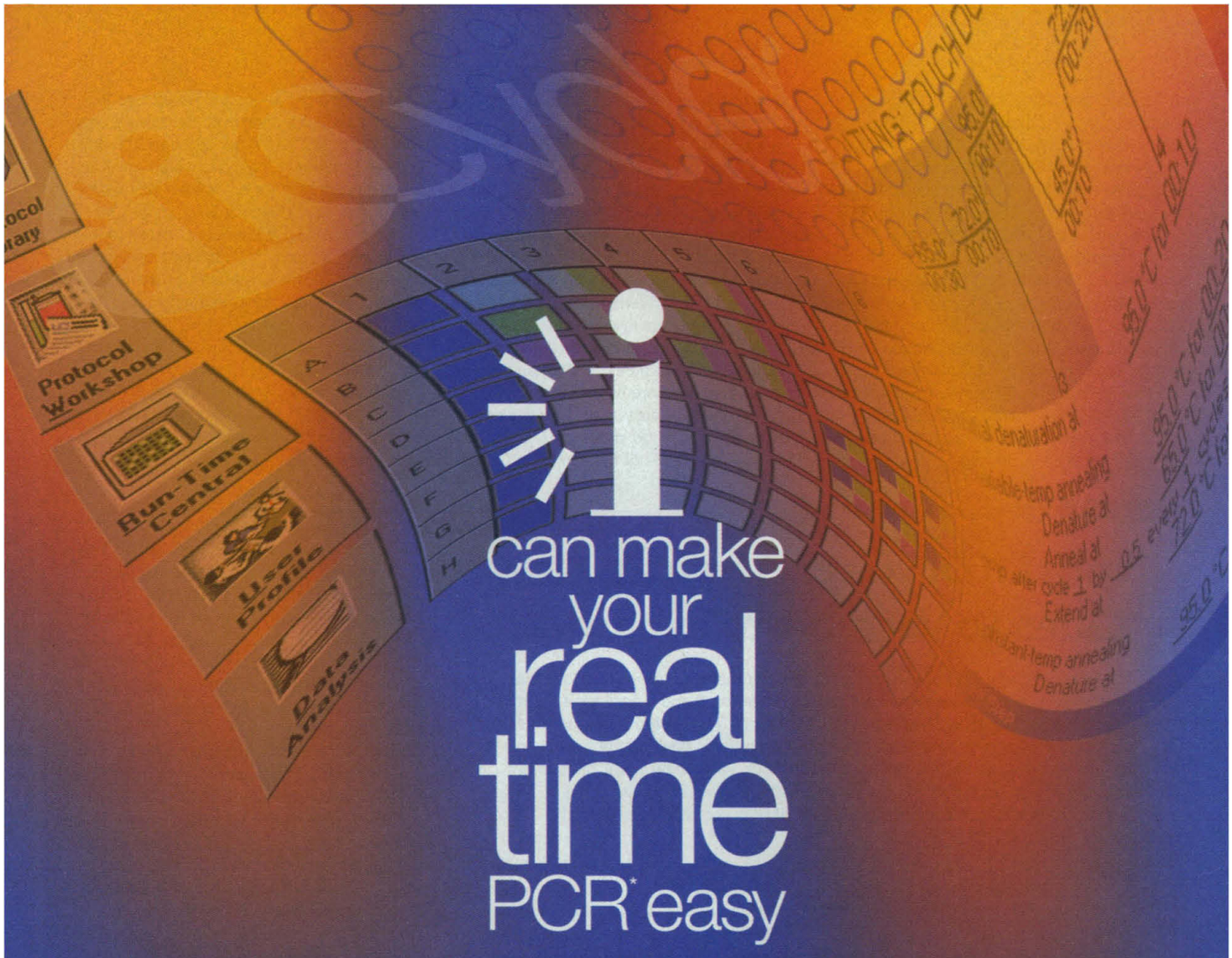
eppendorf® is a registered trademark.

eppendorf

In touch with life

Eppendorf – Netheler – Hinz GmbH · 22331 Hamburg · Germany · Life Science Application-Hotline: +49 180-3666789 · Fax +49 40-53801-556
e-mail: eppendorf@eppendorf.com · eppendorf home page: http://www.eppendorf.com
Eppendorf Scientific, Inc. · One Cantiague Road · Westbury, NY 11590-0207 · Phone 800-421-9988 or 516-876-6800 · Fax 516-876-8599
e-mail: eppendorf@eppendorfsi.com · website: www.eppendorfsi.com

Circle No. 11 on Readers' Service Card



i can make your real time PCR* easy

The New iCycler™ is All You've Ever Wanted From a Thermal Cycler and All You'll Ever Need for Real Time PCR.

It's coming soon. For more information, watch for upcoming promotions or contact your local Bio-Rad representative. Visit our website at **discover.bio-rad.com**.

* *Practice of the patented polymerase chain reaction (PCR) process requires a license. The iCycler includes a licensed thermal cycler and may be used with PCR licenses available from the Perkin-Elmer Corp. Its use with authorized reagents also provides a limited PCR license in accordance with the label rights accompanying such reagents. Some applications may require licenses from other parties.*

BIO-RAD **Bio-Rad Laboratories**

Life Science Group

Website *www.bio-rad.com* ***U.S.*** *(800) 4BIORAD* ***Australia*** *02 9914 2800* ***Austria*** *(01)-877 89 01* ***Belgium*** *09-385 55 11* ***Canada*** *(905) 712-2771*
China *86-10-62051850/51* ***Denmark*** *45 39 17 99 47* ***Finland*** *358 (0)9 804 2200* ***France*** *01 43 90 46 90* ***Germany*** *089 318 84-0*
Hong Kong *852-2789-3300* ***India*** *(91-11) 461-0103* ***Israel*** *03 951 4127* ***Italy*** *39-02-216091* ***Japan*** *03-5811-6270* ***Korea*** *82-2-3473-4460*
Latin America *305-894-5950* ***Mexico*** *514-2210* ***The Netherlands*** *0318-540666* ***New Zealand*** *64-9-4152280* ***Norway*** *22-74-18-70*
Russia *7-095-4585822* ***Singapore*** *65-2729877* ***Spain*** *34-91-661-7085* ***Sweden*** *46 (0)8-55 51 27 00* ***Switzerland*** *01-809 55 55*
United Kingdom *0800-181134*

Sig 022499

Circle No. 22 on Readers' Service Card

Handbook of Experimental Pharmacology

The Handbook of Experimental Pharmacology publishes reviews of the most significant areas of pharmacological research, written by leading international authorities, including Nobel prize winners, in topical volumes.

Volume 135/1

M. Oettel, Jena, Germany;
E. Schillinger, Berlin, Germany (Eds.)

Estrogens and Antiestrogens I

Physiology and Mechanisms of Action of Estrogens and Antiestrogens

1999. Approx. 360 pp. 30 figs., 2 in color, 18 tabs.
Hardcover approx. US $ 288.00
ISBN 3-540-65016-4

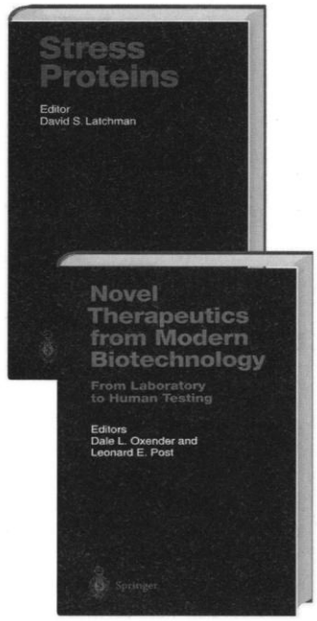
Volume 135/2

Estrogenes and Antiestrogens II

Pharmacology and Clinical Application of Estrogens and Antiestrogens

1999. Approx. 600 pp. 85 figs., 2 in color, 62 tabs.
Hardcover approx. US $ 474.00
ISBN 3-540-65580-8

Part I discusses the complex chemistry of steroidal and non-steroidal estrogens and antiestrogens as well as the molecular mechanisms of estrogen action. Information is provided on the metabolism and the various physiological and pathophysiological responses. Part II extends the information to address the broad variety of pharmacological activities, their kinetics and toxicology. Particular emphasis is placed on the potential of these compounds in an impressive number of clinical indications.



Volume 136

D.S. Latchman, University College London, UK (Ed.)

Stress Proteins

1999. XXII, 422 pp. 49 figs., 7 tabs.
Hardcover US $ 320.00
ISBN 3-540-65017-2

A comprehensive account emphasizing the functions of the different stress proteins in unstressed and stressed cells of different types, their regulation by stressful and non-stressful stimuli and their roles in a range of human diseases.

Volume 137

D.L. Oxender, L.E. Post, Parke-Davis Pharmaceutical Research, Ann Arbor, MI, USA (Eds.)

Novel Therapeutics from Modern Biotechnology

From Laboratory to Human Testing

1999. XVII, 248 pp. 34 figs., 19 tabs.
Hardcover US $ 299.00
ISBN 3-540-65025-3

The first chapter addresses FDA regulatory expectations for biotech products, while the following chapters discuss general issues common to each class of biotech drug such as proteins, peptides, and nucleic acids. The rest of the chapters deal with specific biotech drugs that have successfully made it into clinical trials.

Volume 138

M.J. Eadie, University of Queensland, Herston, QLD, Australia;
F. Vajda, Fitzroy, VIC, Australia (Eds.)

Antiepileptic Drugs - Pharmacology and Therapeutics

1999. Approx. 570 pp. 24 figs., 39 tabs.
Hardcover US $ 399.00
Prepublication price valid until July 31, 1999: US $ 312.00
ISBN 3-540-65374-0

Subjects include the neurophysiological and biochemical mechanisms of action of the antiepileptic drugs, their testing in experimental animals, their interactions, their clinical use, and the new agents currently under development.

Orders from U.S. and Canada should be sent to: Springer-Verlag NY, Inc.· P.O. Box 2485 Secaucus, NJ 07096-2485 · Tel: toll free: 1-800 SPRINGER · Fax: (201) 348-4505 e-mail: orders@springer-ny.com or to your local bookstore

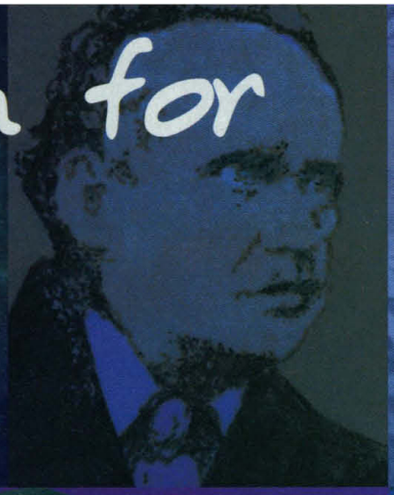
Orders outside North America should be sent to: Springer-Verlag Berlin Fax: + 49/30/827 87-301 · e-mail: orders@springer.de or to your bookseller

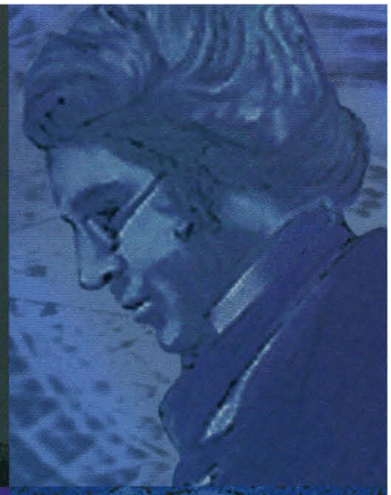
Springer

Prices and other details are subject to change without notice. In EU countries the local VAT is effective. 5959/MNT/SF Ro./Ha.

Circle No. 42 on Readers' Service Card

the search for meaning





"Nothing in life is to be feared.
It is only to be understood".

Marie Curie (1867-1934).
Polish-French Chemist. Two time Nobel Prize winner.

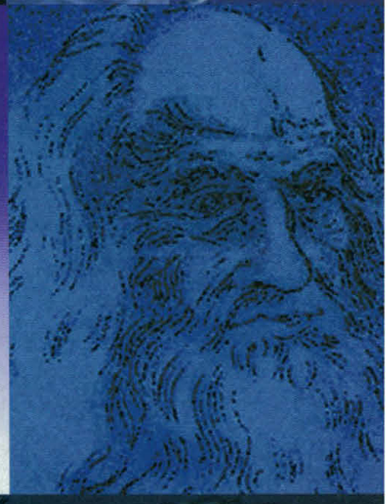
Today's science is faster, more automated and more routine than in the days of the first pioneers and we have all had to learn new skills.

Like juggling - the ability to balance budgets with demands for better quality data. And firewalking - the capacity to deliver greater throughput and more reliable results at the same time.

But there is still magic to be found and new mysteries to unravel. As Einstein said, "The important thing is not to stop questioning".

The Quantum Prep HT/96 Plasmid Miniprep kit with patented Quantum Prep Matrix.

Your fastest alternative for high throughput plasmid DNA purification.



Bio-Rad Laboratories has supported this quest for truth for more than 40 years. Our products provide the basis for new insights, new approaches, new discoveries.

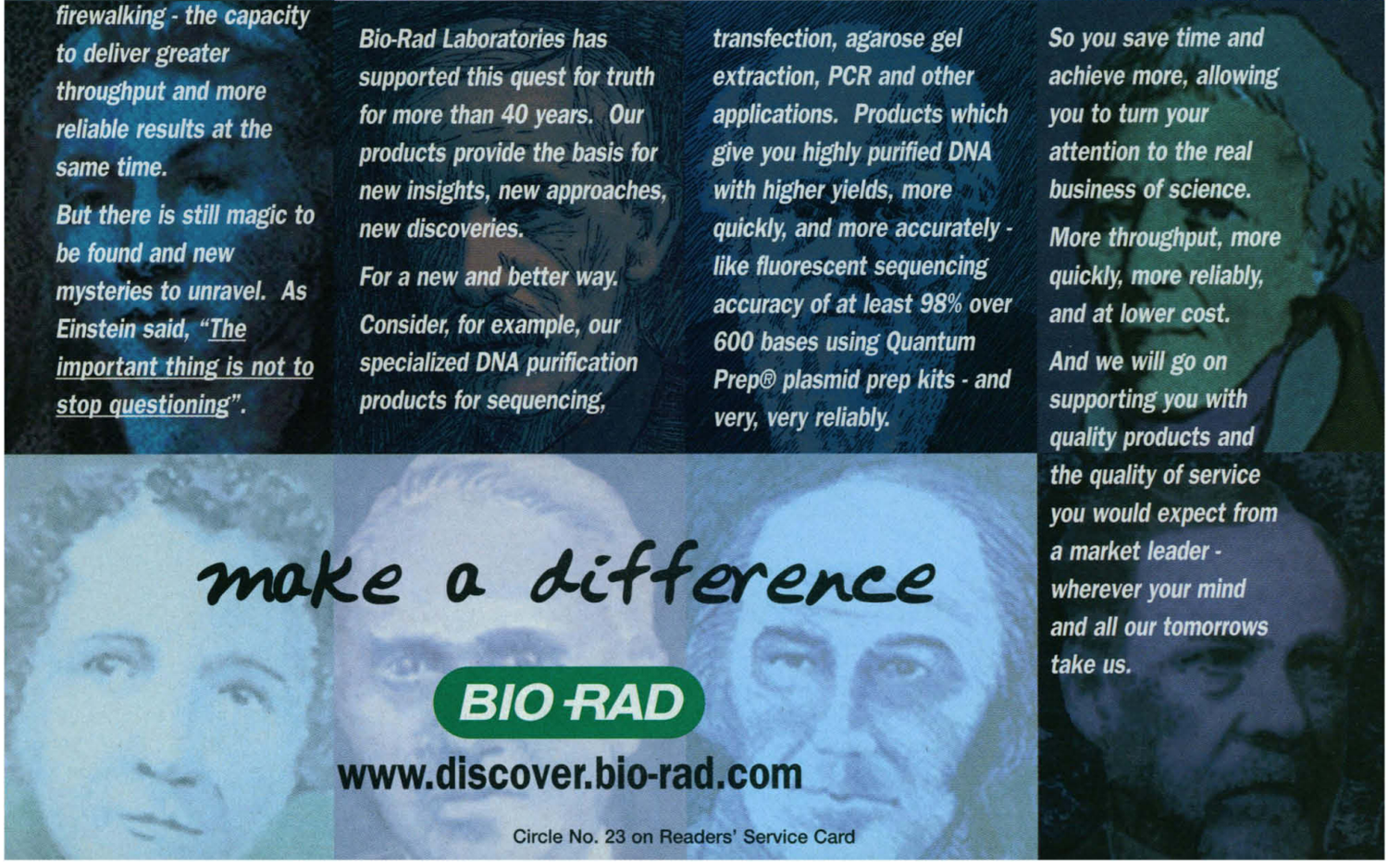
For a new and better way.

Consider, for example, our specialized DNA purification products for sequencing, transfection, agarose gel extraction, PCR and other applications. Products which give you highly purified DNA with higher yields, more quickly, and more accurately - like fluorescent sequencing accuracy of at least 98% over 600 bases using Quantum Prep® plasmid prep kits - and very, very reliably.

So you save time and achieve more, allowing you to turn your attention to the real business of science.

More throughput, more quickly, more reliably, and at lower cost.

And we will go on supporting you with quality products and the quality of service you would expect from a market leader - wherever your mind and all our tomorrows take us.



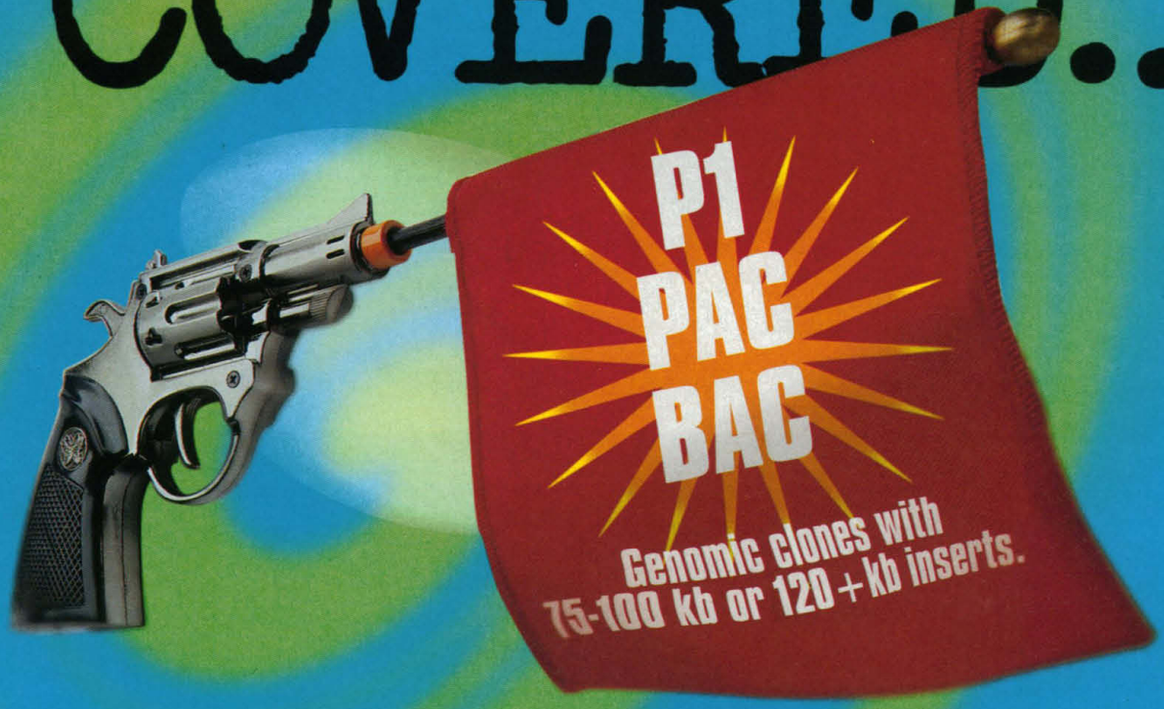
make a difference

BIO-RAD

www.discover.bio-rad.com

Circle No. 23 on Readers' Service Card

WE'VE GOT YOU COVERED...



Genome Systems would like to read you your rights!

You have the right to screen large insert genomic P1, PAC, and BAC libraries.

Any probe or primer set can, and will, be used to isolate the clone of your choice.

You have the right to an experienced technician who will take pride in identifying your clones for you.

If you cannot afford the time that other companies will take,
our technicians will perform the screens for you in only 8 to 10 days.

You may waive your right to have Genome Systems isolate your clones for you and elect to isolate the clone yourself with our "Down-to-the-Well®" PCR'able DNA pools, High-density Filters, and DNA isolation kits.

Genome Systems...More Bang for Your Buck!

Get it Now. 800-430-0030.

GenomeSystemsInc™

4633 World Parkway Circle, St. Louis, MO 63134-3115
PHONE: 314.427.3222 FAX: 314.427.3324 E-MAIL: info@genomesystems.com WEB: www.genomesystems.com
FRANCE: Appel gratuit, 0800.90.2104 GERMANY: Rufen Sie uns zum Ortstarif an, 0130.81.9081UK: call us free on, 0800.89.3733
A wholly owned subsidiary of Incyte Pharmaceuticals, Inc.

1. The PCR process is covered by patents owned by Hoffman-LaRoche

Circle No. 41 on Readers' Service Card

Get Peak Performance from your *Taq* DNA Polymerase

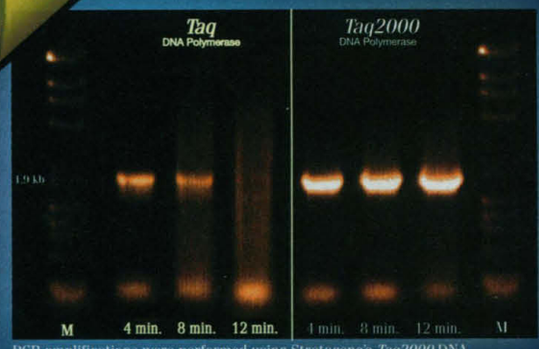
Taq2000™ DNA polymerase[†] is a highly purified, recombinant *Taq* DNA polymerase that provides superior yield and specificity for all *Taq*-based PCR applications.

Taq2000 DNA Polymerase

- *Most highly purified* Taq *polymerase available*
- *Virtually eliminates background artifacts*
- *Ideal for extreme PCR conditions*
- *Minimizes smearing in long PCR*

Circle No. 45 on Readers' Service Card

Taq2000™
DNA POLYMERASE



PCR amplifications were performed using Stratagene's *Taq2000* DNA polymerase or competitor's cloned *Taq* DNA polymerase. The PCR extension times were 4 minutes, 8 minutes and 12 minutes for a 1.9-kb amplicon of transgenic mouse genomic target DNA.

Taq2000™ DNA Polymerase...For Peak PCR Performance

Taq2000™ DNA Polymerase
100U CATALOG #600195
500U CATALOG #600196
1000U CATALOG #600197

UNITED STATES:
Stratagene Cloning Systems
(800) 424-5444
INTERNET MAIL:
techservices@stratagene.com

AUSTRALIA: (02) 9417 7866
AUSTRIA: (0222) 3 68 99 51
BRAZIL: 11 5561-1771
CANADA: (800) 424-5444
DENMARK: 86 10 10 55
FRANCE: (01) 34 60 24 24
GERMANY: (0130) 84 09 11
HONG KONG: 578-9939
INDIA: 3325877
ISRAEL: 03-5761620
ITALY: 02-58.01.34.09
JAPAN: Funakoshi (03)5684-1622
(Toyobo) (03)3660-4813
KOREA: (02)-556-0311
MALAYSIA: 3-7031882
NETHERLANDS: 033 495 00 94
NEW ZEALAND: 9 443-5857
NORWAY: 22 20 01 37
PORTUGAL: 01-441 06 84
SINGAPORE: 2736822
SPAIN: 1 729 03 33
SWEDEN: (8) 6800845
SWITZERLAND: (061) 8 83 05 40
THAILAND: (662) 308-0611
UNITED KINGDOM: 0800 585370

OTHER COUNTRIES CALL
STRATAGENE USA: (619) 535-5400

STRATAGENE®

[†] Purchase of this enzyme is accompanied by a license to use it in the Polymerase Chain Reaction (PCR) process in conjunction with an Authorized Thermal Cycler. Stratagene's PCR products are sold under licensing arrangements with Roche Molecular Systems, Inc., F. Hoffmann-La Roche and The Perkin-Elmer Corporation.

medical schools. (Early data suggest that the Research Training Fellowships for Medical Schools program is indeed successful in reinforcing interest in research, at least to the point of seeking postdoctoral training.)

Another relevant initiative is the HHMI Biomedical Research Support for Medical Schools program, which awarded $80 million to 30 medical schools in 1995. Those 4-year grants have provided start-up funding for more than 150 faculty, of whom 33 are M.D.'s or M.D./Ph.D.'s. In addition, 46 M.D.'s and M.D./Ph.D.'s have received funding for pilot projects. A second competition in the year ahead will award $90 million.

Rosenberg presents compelling data on the relative decline of physician applications to NIH for research grant support, and notes that our physician postdoctoral program data support his concern for the future pool of physician-scientists. While the HHMI data cited show a 57% decline (from 174 to 74 applicants), the actual decline was 45%. The latter figure includes not only M.D. but also M.D./Ph.D. applicants. The actual decline was from 276 (a 5-year high) to 152. Although of definite concern in the context of future trends in the pool of physician-scientists, the numbers are confounded by the increase in K awards by NIH. We see application withdrawals and fellowship declines because of these awards, and will follow closely their future impact on the HHMI program.

Joseph G. Perpich
Vice President, Grants and Special Programs, Howard Hughes Medical Institute, Chevy Chase, MD 20815–6789, USA

CORRECTIONS AND CLARIFICATIONS

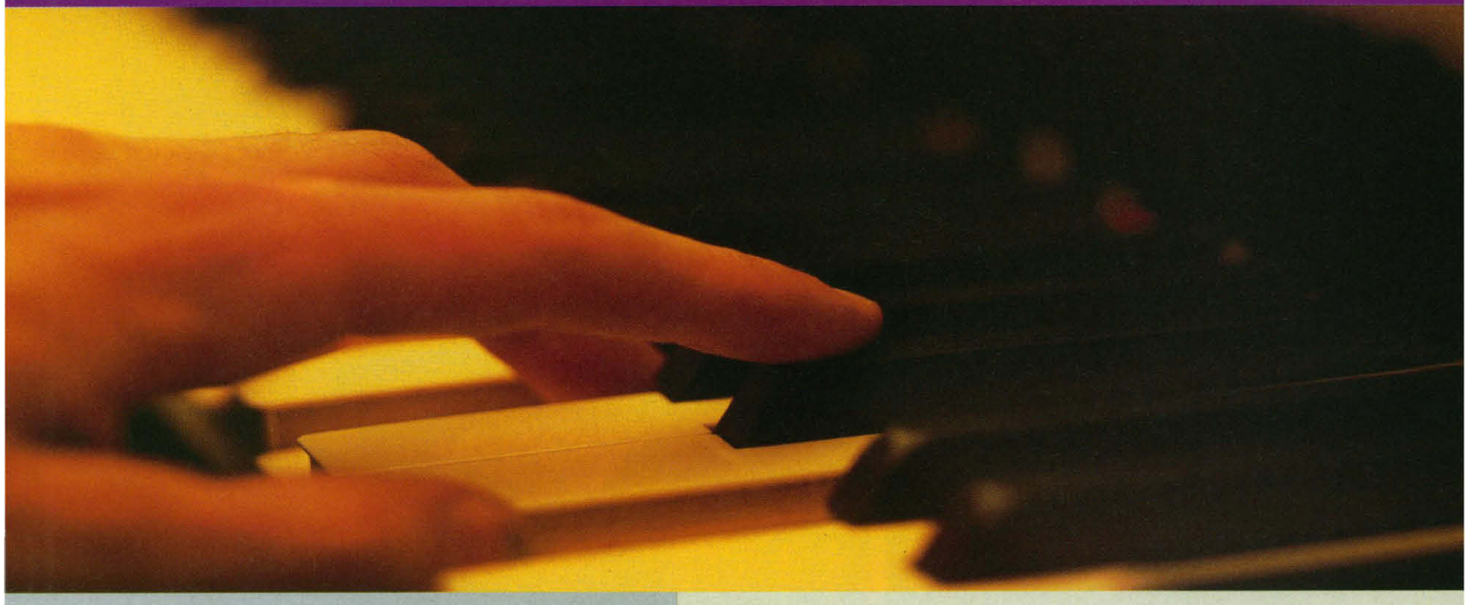
The word "innervation" was misspelled as "enervation" in This Week in *Science* of 19 February (p. 1083, column 2, line 13 from the top) and "innervate" as "enervate" in Letters of 8 January (p. 175, column 1, line 8 from the bottom).

In his article "Galaxies seen at the universe's dawn" (News of the Week, 1 Jan., p. 19), Govert Schilling states that the photometric method of measuring the redshift of galaxies was pioneered "a few years ago." In fact, it was pioneered by W. A. Baum, then at the Mount Wilson and Palomar Observatories, in 1957 [*Astronom. J.* **62**, 6 (1957)].

In the map accompanying the Policy Forum "Conservation targets in South American temperate forests" (13 Nov., p. 1271), Uruguay was misspelled.

The Institute for Advanced Study in Princeton, New Jersey, is not "at Princeton University," as was stated in the biographical sketch of Nathan Myhrvold (Essays on Science and Society, 23 Oct., p. 621).

A Winning Performance.



SORVALL®

Save time and space with the Discovery™ M150 personal micro-ultracentrifuge.

Shorter total run times, a space-saving design and an easy to use operator interface: it all adds up to a winning performance from the Discovery™ M150 personal micro-ultracentrifuge.

- Speeds to 150,000 rpm and low rotor k factors mean faster, more efficient separations
- Compact and personal *without* occupying valuable lab bench space
- 13 different rotors, with volumes to 81 ml
- Simple run-parameter entry

Find out more about the Discovery™ M150 and the full range of Discovery™ Series ultracentrifuges by contacting Kendro Laboratory Products today.

Visit us at ASM, booth #633.

Circle No. 21 on Readers' Service Card

Kendro Laboratory Products

A worldwide company formed by the merger of Heraeus Instruments and Sorvall.

Offices worldwide: In the US, call 1-800-522-SPIN, Fax 203-270-2210.
In Europe, 49 (6181) 35-300, Fax 49 (6181) 35-59 44.
In Asia Pacific, 203-270-2080, Fax 203-270-2210.
Or contact your local Kendro Laboratory Products Representative.

www.kendro.com

Retroviral Vector Plasmid pDON-AI

Today's Research for Tomorrow's Revolution

Modified for More Advantageous and Safer Gene Transfer into Mammalian Cells

pDON-AI DNA*(Code # 3650: 20μg)

Safer Cell Transduction with No Viral Coding Sequence

Removal of entire viral coding sequences (*gag*, *pol* and *env*) greatly reduces the potential of RCR (replication competent retrovirus) generation and significantly improves safety in cell transduction.

Higher Gene Expression and Viral Titer

The HCMV IE (human CMV immediate-early) promoter provides higher viral titer through a simple transient transfection in packaging cell lines.

Versatile Construction of Viral Vectors

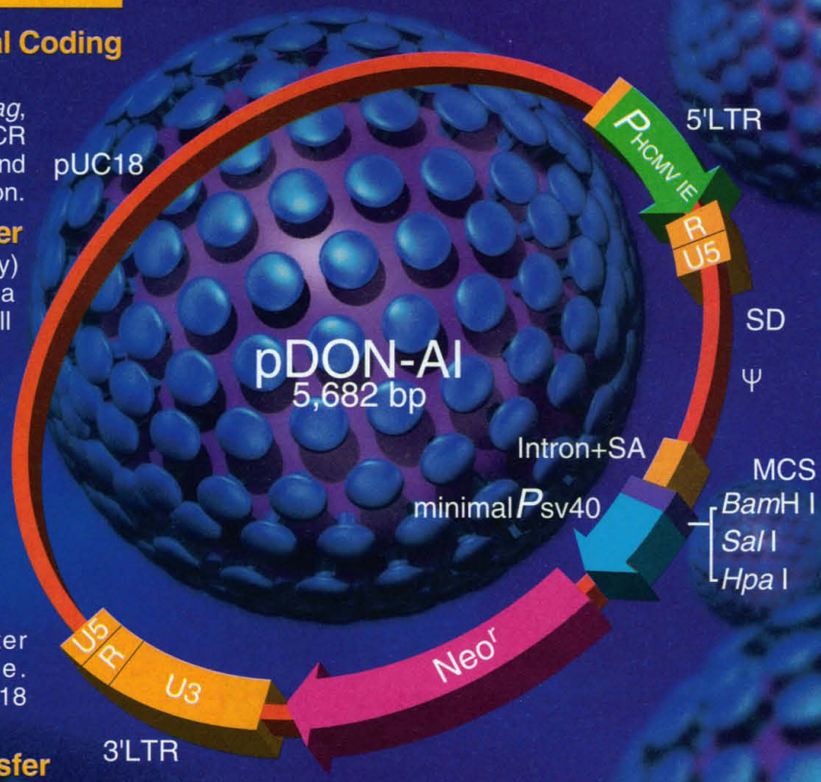
Smaller vector size (2,982 bp) derived from MLV allows insertion of larger DNA fragments, while the multicloning site facilitates a fragment variety.

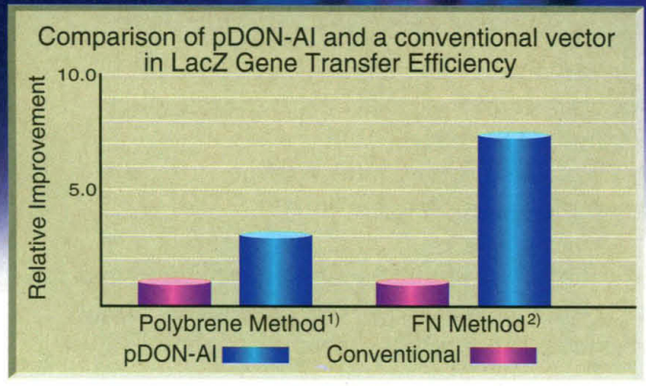
More Handling Convenience

The antibiotic selective Neo^r marker gene is included with the minimal SV40 promoter downstream from the inserted gene. Furthermore, the backbone plasmid of pUC18 provides more ease in culture handling.

Synergistic Efficiency of Gene Transfer with RetroNectin™

In conjunction with the RetroNectin™, retroviral vectors constructed from plasmid pDON-AI transduces target cells even more efficiently.





1) Polybrene Method: NIH/3T3 cells were transduced in the presence of polybrene with the virus supernatant obtained by respective vector transfections. Viral titers were calculated as relative values by analyzing X-gal (+) cell numbers.
2) FN Method: NIH/3T3 cells were transduced on the rh FN fragment CH-296 (RetroNectin™) coat with the virus supernatant obtained by respective vector transfections. Viral titers were calculated as relative values by analyzing G418 resistant colony numbers.

RetroNectin™
(Code # T100A: 0.5 mg/vial, Code # T100B: 2.5 mg/vial)

Recombinant human fibronectin fragment CH-296, lyophilized

RetroNectin™ Dish
(Code # T110A: 10 dishes/ package)

CH-296 pre-coated dish (35 mm ϕ)

* Developed by ViroMedica Pacific Limited (Korea)
(1) Yu *et al.* (1998) Patent filed (2) Kim *et al.* (1998) *J. Virol.* **72** (2) 994-1004
** All the above products are intended for Research Use Only. Not for Use in Diagnostic or Therapeutic Procedures.

TaKaRa
TAKARA SHUZO CO.,LTD.
BIOMEDICAL GROUP
Otsu, Shiga, Japan
Phone:+81 77-543-7247 Fax:+81 77-543-9254

Korea
BOHAN (TaKaRa-Korea) Biomedical Inc.
Phone: (02) 577-2002 Fax: (02) 577-3691
China
TaKaRa Biotechnology (Dalian) Co., Ltd.
Phone: (0411) 763-2792 Fax: (0411) 761-9946
Europe
TaKaRa Biomedical Europe S.A.
Phone: +33 1 41 47 01 14 Fax: +33 1 47 92 18 80

DISTRIBUTORS

USA and the Americas
PanVera Corporation
Toll Free: 800-791-1400
Fax: 608-233-3007
E-mail : info@panvera.com

Europe
BioWhittaker Europe
Phone: +32(0)8732 1611
Fax: +32(0)8735 1967

UK and Ireland
BioWhittaker UK Ltd.
Phone: +44 118 9795234
Fax: +44 118 9795231

Taiwan
Cold Spring Biotechnology Co.,Ltd.
Phone: +886 2-695-9990
Fax: +886 2-695-9963

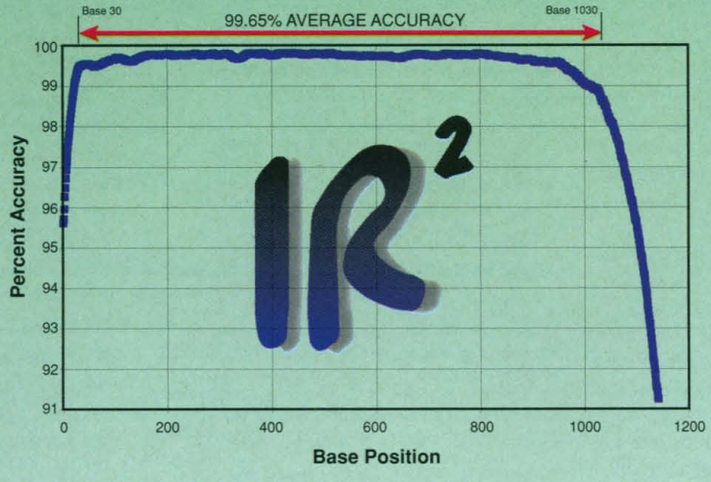
Taiwan
Cheng Chin Trading Co.,Ltd.
Phone: +886 2-331-3111
Fax: +886 2-382-2197

Homepage: http://www.takara.co.jp/english/bio_e/ E-mail: bio-sm@takara.co.jp

Circle No. 13 on Readers' Service Card

Your Options and Output Keep Getting Better.

- 2200 samples from a > 2.2 million bp project
- Average reads > 1000 bp
- Average Accuracy: 99.65%



Data courtesy of Drs. P. Brottier, H. Crespeau & P. Wincker, GENOSCOPE National Sequencing Center, EVRY Cedex, France.

Real World Results

LI-COR IR² Systems are making a measurable difference in labs worldwide by consistently delivering very long read lengths with very high accuracy. New Base ImagIR 4.1 software features a further advancement in base calling accuracy and a new curve file format. PHRED quality values are now included in LI-COR curve files, allowing them to be imported directly into PHRAP. The new curve file format also promotes high base calling accuracy from PHRED sequencing software.

CALL TODAY to learn about other new ways your options keep getting better with LI-COR.

LI-COR®
Biotechnology Division
800•645•4267
www.licor.com

Circle No. 43 on Readers' Service Card